

## **Better Dynamic Postural Stability While Wearing Minimalist Footwear in Physically-Active Male Adults**

Paul N. Whitehead, Timothy C. Sell, Mita Lovalekar, Nicholas R. Heebner, John P. Abt, Scott M. Lephart, FACSM.

University of Pittsburgh, Pittsburgh, PA

Minimalist footwear (MF) has gained significant popularity over the last five years. The majority of existing research has examined running-related injuries and kinematics, but MF may provide a therapeutic benefit when integrated with strength and conditioning programs. To establish if MF is therapeutic, acute differences in a task of dynamic postural stability was assessed in athletic shoes (AS), MF, and military boots (MB). Postural stability has been shown to be a risk factor for ankle injuries, a common ailment in armed forces. If certain footwear can show advantages toward improved postural stability, there will be the potential for future studies to examine extended use. **PURPOSE:** To examine the role of footwear on dynamic postural stability. **METHODS:** Thirty-one healthy males ( $23.5 \pm 4.9$  yrs,  $76.3 \pm 7$  kg,  $175.7 \pm 6.3$  cm) participated in the study, and none had previous experience wearing MF. Subjects jumped with both feet over a 12-inch hurdle from a distance of 40% of their height. Subjects landed on their dominant leg then maintained their balance with hands on hips. Five trials were collected and averaged for each condition. The primary outcome variable was the Dynamic Postural Stability Index (DPSI) and its component scores (APSI, MLSI, and VSI), which were computed using the first three seconds of ground reaction forces following initial contact with force plates recording at 1500 Hz. A higher DPSI or component score indicates worse postural stability. One-way repeated measures ANOVA was used for hypothesis testing at  $p < 0.05$ . **RESULTS:** DPSI was significantly higher in AS compared to both MB ( $p < 0.001$ ) and MF ( $p < 0.001$ ). The component scores were all significantly lowest ( $p \leq 0.001$ ) in MF. **CONCLUSION:** The MF scores indicate better stability compared to AS acutely. This could be due to less material interfering with the ability to respond to perturbations. By training in MF, individuals could have exposure to accelerated proprioception that might otherwise be muted by AS, experience strengthening benefits, and experience postural stability enhancements longitudinally. This could lead to a reduction in ankle injury risk. Lower scores in MB compared to AS were not expected, but it could be due to the cutaneous feedback from the high-top ankles and more rigid body of MB. Supported by the Freddie H. Fu, MD Graduate Research Award.